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50X1-HUM

ZIS-151 trucks put out prior to 1950 were equipped with four-cycle, six-cylinder, 90-horsepower ZIS-120 motors. Since the beginning of 1950, the plant has also been installing the ZIS-121 motor, which differs from the ZIS-120 in the design of the lubricating, fuel, and cooling systems.

The lubricating system of the ZIS-121 motor is mixed (force-feed and splash), and has an oil cooling radiator located in front of the water radiator. The oil radiator goes into action under difficult road conditions and high external temperatures. A gear-action double oil pump fitted with a floating oil intake is used on the ZIS-121 motor. The floating oil intake assures a normal supply of oil to the main supply line when the truck is ascending inclines up to 25 degrees. The lower gears of the double pump feed oil into the main supply line in much the same way as the single oil pump on the ZIS-120 motor. The upper gears pump oil into the oil radiator.

The ZIS-121 motor has a down-draft carburetor with a variable aperture diffuser and a governor that limits the revolutions per minute of the crankshaft.

A-66 gasoline is used for the ZIS-151 truck, which has two 150-liter gasoline tanks connected to each other by gas lines. A three-way control cock is located on the right gas tank. To connect the right gas tank to the carburetor the control knob is turned to the right; to connect the left gas tank it is turned to the left (facing the direction of travel of the truck).

The dry, two-disk clutch has iron driving disks and steel driven disks with friction linings. The transmission is of the selective-gear type, with five speeds forward and one reverse speed. Behind the main transmission there is a mechanical two-range transfer case, with a coupling for putting the truck in six-wheel drive. This transfer case not only distributes the torque among the front, middle, and rear axles, but also increases it. The two ranges of the transfer case, together with the six speeds of the main transmission, give the truck ten forward speeds and two reverse speeds. The transfer case control lever is so designed that it is impossible to shift it into low range when the front wheel drive is disconnected. This is to avoid overloading and breakage of parts of the universal joint and rear axles, which are designed so that the torque from the transfer case is distributed to all of the driving axles simultaneously when the truck is in low range.

The front-wheel drive should only be used when traveling over difficult terrain. When driving on hard-topped roads, the front-wheel drive should be disconnected to save fuel and to reduce wear on tires and parts of the power transmission. Front-wheel drive can be engaged while parked or when the truck is in motion. However, if the wheels of the rear axles slip, front-wheel drive cannot be engaged while in motion. Shifting from high range to low range of the transfer box can be done only after coming to a full stop. Shifting from low range to high range can be done at any speed.

Five open-type propeller shafts on needle bearings transmit the torque from the transmission to the transfer case, and from the transfer case to the main gears of the driving axles. Thus, the main driving gear of each axle is turned by a separate propeller shaft. All three driving axles (front, middle, and rear) of the ZIS-151 truck are of the divided type.

The front suspension consists of two longitudinal semielliptic springs attached to the frame. The springs work in conjunction with two double-action hydraulic shock absorbers.

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The suspension of the middle and rear axles consists of two longitudinal inverted semielliptic springs which are rigidly fastened at the center to special spring seats by spring clips. The flat ends of the springs are attached to the axle housings by sliding collars.

Rods are used to transmit thrusting forces and reactive moment. The thrust (lower) rods are attached on one end to ball pins fastened to the frame brackets, and on the other end joined ball and socket fashion to the brackets on the axle housing. The reactive (upper) rods are connected at one end to the brackets on the axle housing, and on the other end to special brackets on the frame.

The front axle of the ZIS-151 is not only a driving axle, but also a driven axle. It consists of a bevel gear, a differential, and a rotating cam. Divided axles of the unloaded type transmit torque from the main transmission and the differential to the driving wheels. A universal joint of constant angular velocity is used to transmit torque to the front driving wheels, assuring uniform rotation speed of the wheels at sharp turning angles.

The universal joint consists of two yokes, four driving balls, one center ball, a locking pin, and a locking bolt. There are four slots in the yokes to hold the driving balls. When there is relative motion of the yokes, the balls roll in the slots.

The inner end of the axle shaft is connected to the differential side gear by a spline; the outer end is integrated with the driving yoke of the constant angular velocity universal joint.

The driving yoke of the universal joint is integrated with the shank, which has a sleeve mounted on its splines. This sleeve ends in a flange which is attached to the wheel hub.

The rotating journal turns on the steering-knuckle pivots. The two halves of the rotating journal are bolted around the ball retainer, the flange of which is bolted to the axle shaft housing.

Center pins are welded onto the top and bottom of the ball retainer and tapered roller bearings fitted to them. A journal holding the wheel hub on two tapered roller bearings is attached to the outer half of the rotating journal body. A packing gland between the rotating journal body and the ball retainer keeps the grease in the universal joint and protects it from dirt.

Middle and rear axles differ from each other in the location of the bevel gear housing and the attachment of the reaction rod brackets.

All four axle shafts and axle shaft housings of the middle and rear axles are of different length because the rear and middle axles are displaced from the center of the truck's longitudinal axis.

The air brake system of the ZIS-151 has six air chambers and two reservoirs. The air storage tank is charged with air up to a pressure of 7-8 kilograms per square centimeter by the compressor. The air pressure in the system should not fall below 5 kilograms per square centimeter for safe operation of the brakes.

The truck uses 8.25-20 tires with a pressure of 4.0 kilograms per square centimeter in the front tires and 3.0 kilograms per square centimeter in the rear tires. Trucks without winches can be fitted with 34 x 7 tires with 5.5 kilograms per square centimeter pressure in the front tires and 5.0 kilograms per square centimeter in the rear tires.

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The ZIS-151 truck has a 12-volt electrical system and a battery with a capacity of 100 ampere hours. The generator does not have a movable third brush. Charging current is regulated by a voltage regulator under the hood.

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